

Little Paint Branch Watershed Study

**Montgomery County
Department of Environmental Protection
Watershed Management Division**

March 17, 1997



FOR FURTHER INFORMATION CONTACT:

**Keith Van Ness, Senior Aquatic Ecologist
Watershed Management Division
Department of Environmental Protection
240-777-7726**

Little Paint Branch Watershed

Introduction to the Watershed

The Montgomery County portion of the Little Paint Branch watershed is located in eastern Montgomery County (Figure 1). The entire watershed is in Montgomery and Prince George's Counties. Little Paint Branch originates in the vicinity of Burtonsville, Md. and flows in a southerly direction joining Paint Branch on the grounds of the Beltsville Agricultural Research Center in Prince George's County. The portion of the watershed located in Montgomery County is generally bounded by Old Columbia Pike to the west, Sandy Spring Road (Md Route 198) to the north, Cherry Hill Road to the south, and the Montgomery County line to the east (Figure 1). The watershed lies along the fall line between the Piedmont ecoregion and the Coastal Plain ecoregion. This area, or transition zone, is characterized by a stream with a steeper gradient than otherwise found in the piedmont, exposed areas of instream rocks and boulders, and confining valley walls. Portions of the Little Paint Branch watershed also exhibit stream conditions characteristic of both ecoregions. The portion of the watershed located within Montgomery County occupies approximately 3490 Acres. There are approximately 14.7 stream miles within this portion of the watershed.

Development within the watershed consists mostly of medium to high-density residential and commercial development (Figure 1). The commercial development is located primarily along Columbia Pike (Md Route 29) in the westernmost portion of the watershed and around the intersection of Sandy Spring Road and Columbia Pike in the community of Burtonsville. The least developed areas of the watershed occur along the upper reaches of the watershed above Greencastle Road and along the Montgomery/Prince George's County border in the Little Paint Branch stream valley park (Figure 1).

Forested areas of the watershed consist of floodplain forest along the different stream valleys and large upland forested tracts within County owned park land (Figure 1). The largest, contiguous forested area lies within Fairland Regional Park.

The number of stormwater management facilities increases as you move north in the watershed. The northern portion of the watershed was developed, for the most part, after the implementation of stormwater management requirements. The southern portion of the watershed was mostly developed prior to stormwater management requirements, as such there are few facilities located there.

Analysis of the 1996 Stream Monitoring and Habitat Data.

Resource Condition

The Index of Biological Integrity (IBI) was applied to the results of spring benthic macroinvertebrate and summer fish stream monitoring conducted in the Little Paint Branch

Little Paint Branch Watershed

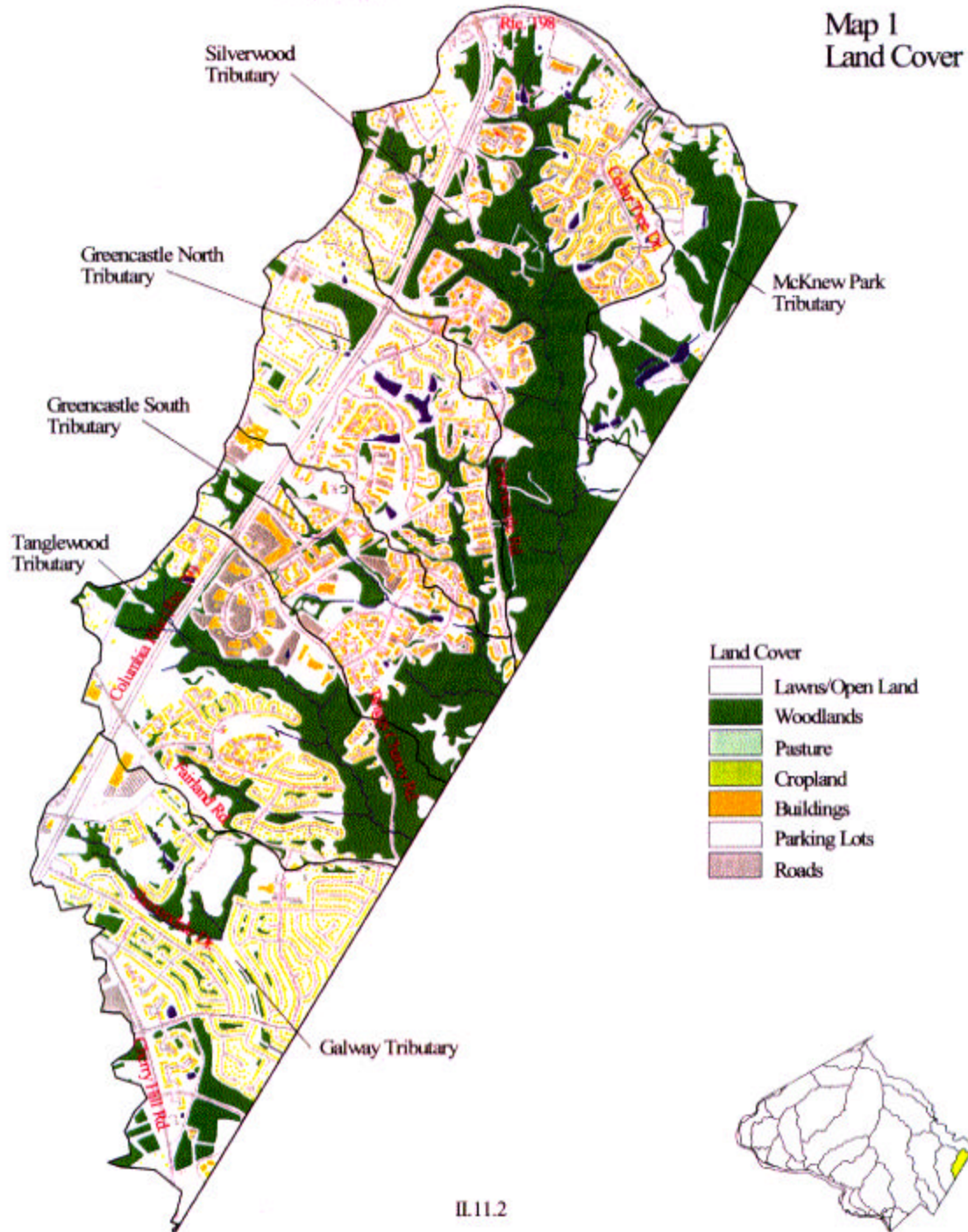


Figure 1. Little Paint Branch Land Cover Within Montgomery County.

watershed during 1996 (Figure 2). Ten stream stations, distributed throughout the watershed, were monitored. Resource condition scores were determined for each of five subwatersheds; the Galway Tributary, Tanglewood, Greencastle South Tributary, Greencastle North Tributary, and the Silverwood Tributary (Figure 2). The Galway Tributary (Calverton area) received a resource condition rating of *poor*, the Tanglewood Tributary and the Greencastle South Tributary and the Greencastle North Tributary received a resource condition of *fair*, and the Upper Little Paint Branch (or Silverwood subwatershed above Greencastle Road) received a resource condition rating of *Good* (Figure 2).

The resource condition ratings follow a trend with the lowest rating occurring in the most downstream portions of the watershed and the ratings improving in the upstream areas. This corresponds to the development pattern of the watershed. The southern portion of the watershed experienced the earliest development. Most of this early development was not required to provide stormwater management controls. In addition, regulations protecting streams and wetlands were almost non-existent at that time resulting in many stream channels being piped or channelized.

Existing Development/Resource Condition

Galway Tributary (Calverton)

The lower portion of the Galway Tributary is conveyed by a trapezoidal concrete channel and thus possesses little or no habitat value. Upstream of the trapezoidal channel, encroachment upon the channel by residential lots, a general lack of riparian vegetation, and high storm flows have limited habitat value within the channel. The habitat assessment for the Galway Tributary (station LPLP101) indicated a fair habitat assessment score. This was the lowest habitat rating within the Little Paint Branch watershed. The overall resource condition of the Galway subwatershed was rated as *poor* (Figure 2).

Tanglewood, Greencastle South Tributary, and Greencastle North Tributary

The Tanglewood, Greencastle South Tributary, and the Greencastle North Tributary developed latter than the Galway Tributary area and have more acreage controlled by SWM structures. There are areas without SWM controls, but to a lesser degree than the Galway Tributary. The Tanglewood Tributary (stations LPLP104 and station LPLP202), Greencastle South Tributary (station LPLP205), and Greencastle North Tributary (station LPLP204) received a resource condition rating of *fair* (Figure 2). Habitat at all stations was rated as good.

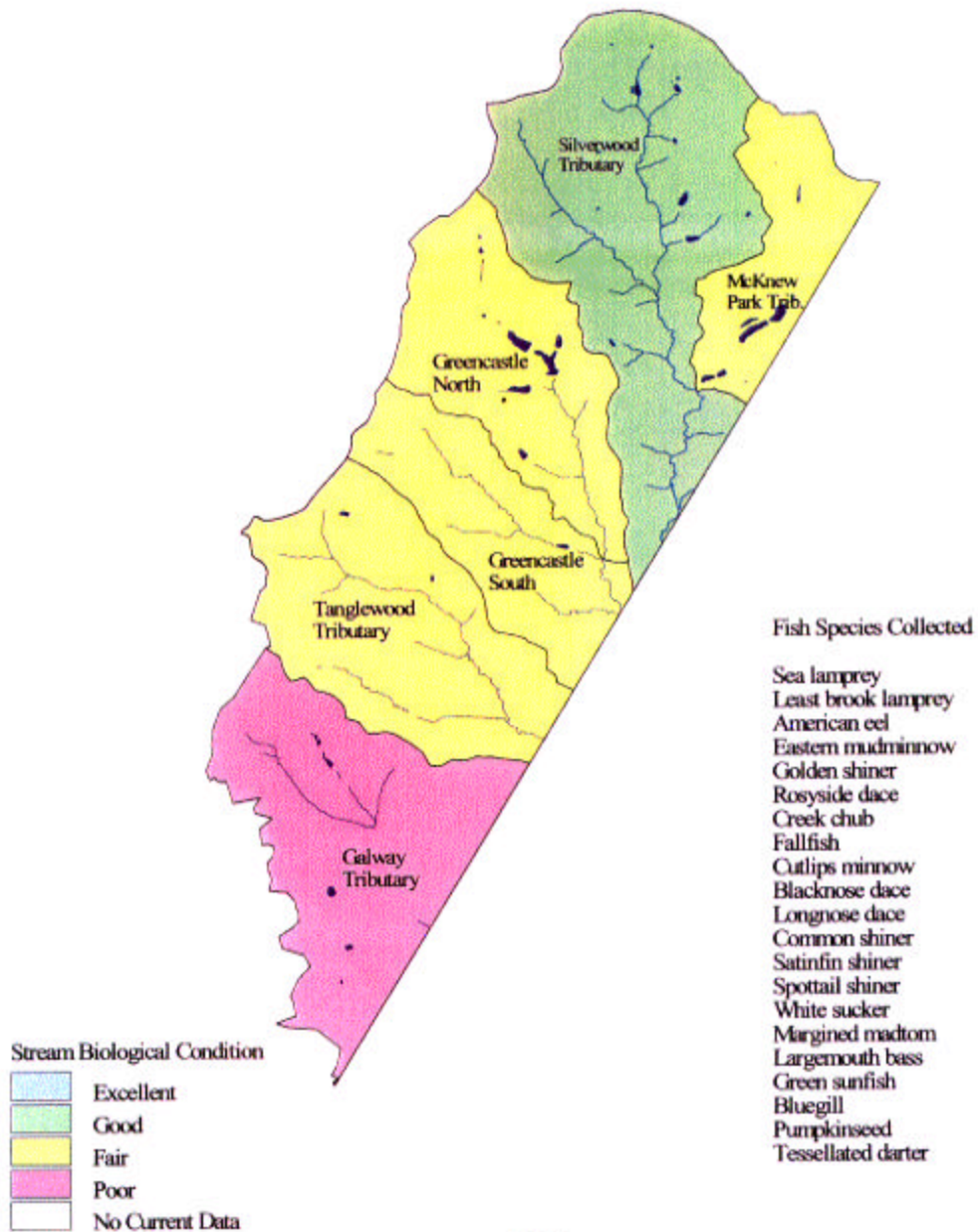
Silverwood (Upper Little Paint Branch Tributary)

The Upper Little Paint Branch watershed received an overall resource condition rating of *good* (Figure 2). Five stream sampling stations were located in the Upper Little Paint Branch watershed (stations LPLP109, LPLP206, LPLP207, LPLP301, & LPLP302). The average benthic macroinvertebrate IBI rating for these sampling stations was *good*. The average fish IBI rating for

Little Paint Branch Stream Condition

Based on biological indicators.
See Chapter 2 for details.

Map 3



IL.11.4

Figure 2. Stream Conditions Within the Montgomery County Portion of the Little Paint Branch Watershed

these sampling stations were also *good*. Habitat was rated as good for all stations

Examination of IBI/Habitat Relationships

The relationship of the IBI scores to the stream habitat assessment conducted when the faunal group was monitored can provide information on the stressors likely responsible for the existing resource condition. The graph (Figure 3) assessing the IBI to habitat relationship for fish and spring benthic macroinvertebrates depict trends useful for prioritizing a management strategy for Little Paint Branch.

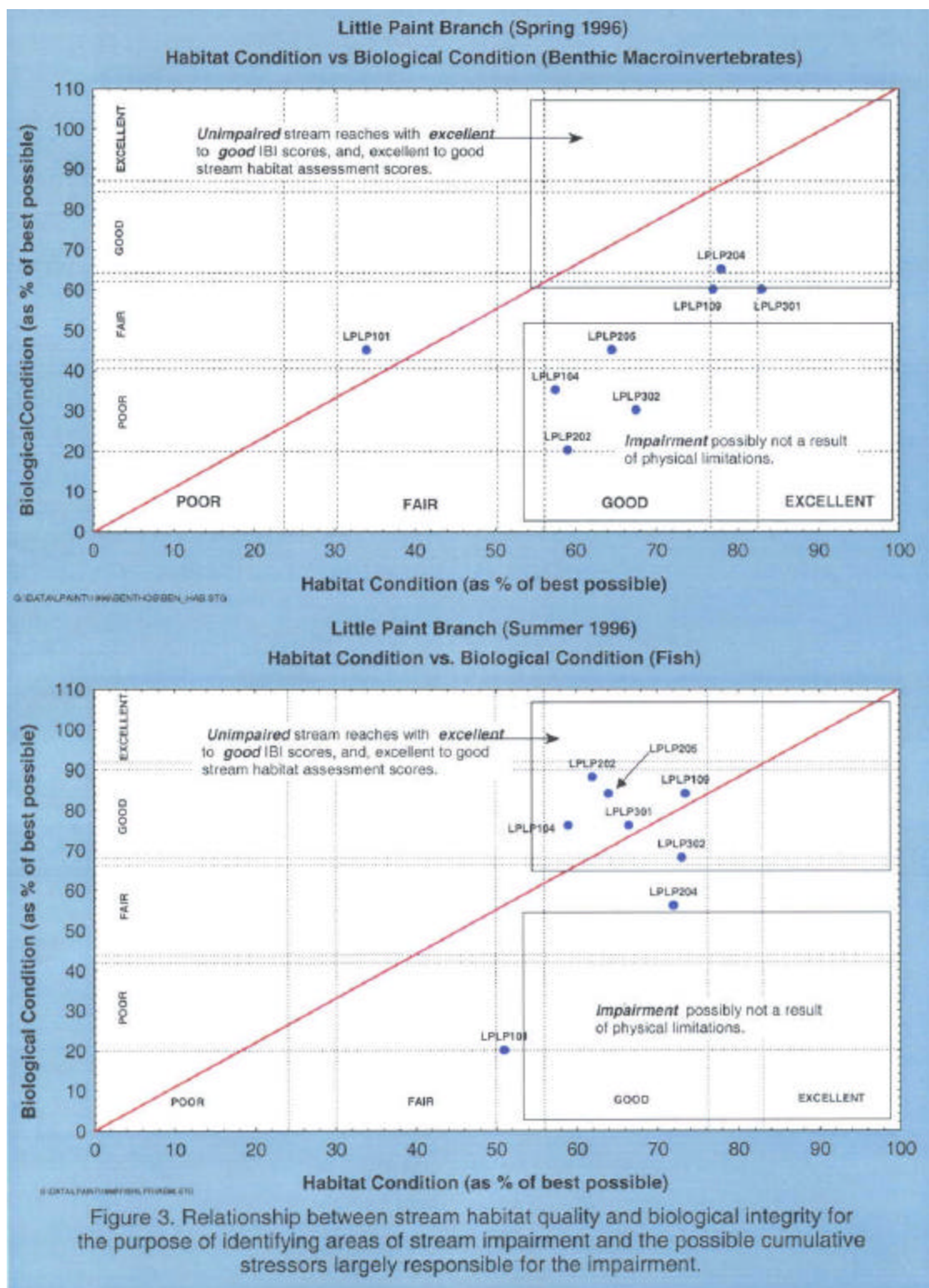
No station had clearly unimpaired stream conditions during both sampling seasons with biological condition scores in the good/excellent range and habitat condition scores in the good/excellent range (Figure 3). Two stations ((LPLP301 and LPLP109), both in the Upper Little Paint Branch subwatershed) had scores bordering an unimpaired condition over both monitoring seasons. Four of eight monitoring stations show impairment possibly not a result of physical limitations during the spring benthic macroinvertebrate monitoring (Figure 3). Two other stations had IBI scores in the high *fair* range but good to excellent habitat assessment scores in the spring. The conditions recorded at these stations probably are a result of the heavy flooding this area experienced in the winter/spring of 1996. Conditions improved in the summer (Figure 3). Six of eight stations had stream conditions within the unimpaired range (Figure 3) indicating recovery from the damage caused by the winter/spring flooding. The *poor* to *fair* benthic macroinvertebrate IBI scores could also be a result of poor benthic macroinvertebrate habitat in the riffle areas.

Select Stream Morphological Measurements

A further evaluation of stream habitat was conducted for areas suspected of having habitat impairment. This evaluation served to determine whether habitat was the limiting factor at these stations.

Galway Tributary

All rapid habitat assessment parameters were found to be fair or poor at the station on the Galway Tributary. The channel is entrenched with total bank heights averaging approximately six feet. Looking downstream, the right stream bank is nearly devoid of vegetation, approximately one-half of the left bank had vegetative coverage. The right stream bank possessed little or no riparian vegetation. This may be due, in part, to the fact that residential lawns were maintained up to the edge of the stream bank. Cross-sectional analysis indicates an entrenched stream that has lost access to its active floodplain (Figure 4). Pebble counts collected at the station indicate that the particle D50 for the riffle in this stream is small cobble (64 to 90 mm) (Figure 5). This is excellent benthic macroinvertebrate riffle habitat that is surprising to find here given the poor benthic macroinvertebrate community identified from this stream reach in 1996. The poor benthic macroinvertebrate community could be a result of the winter/spring floods in the subwatershed, or



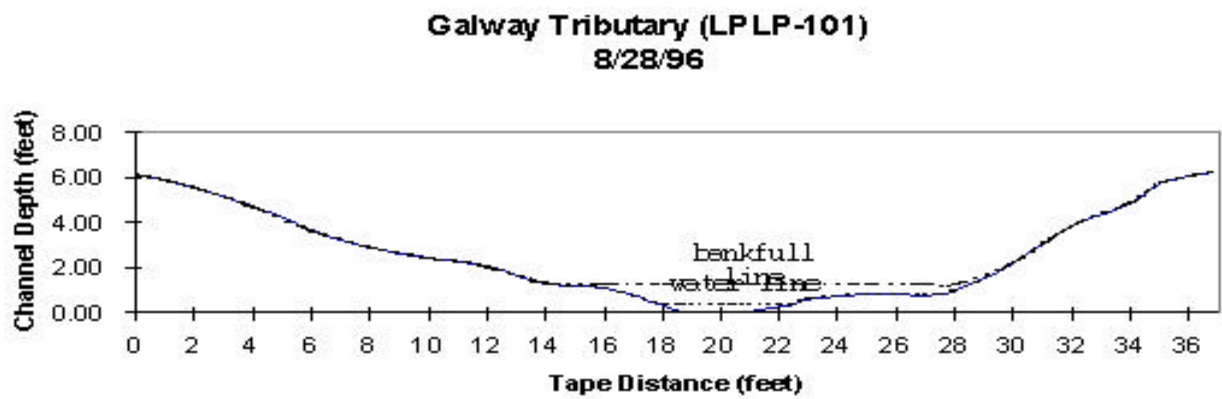


Figure 4. Cross-section of LPLP101, within the Galway Tributary.

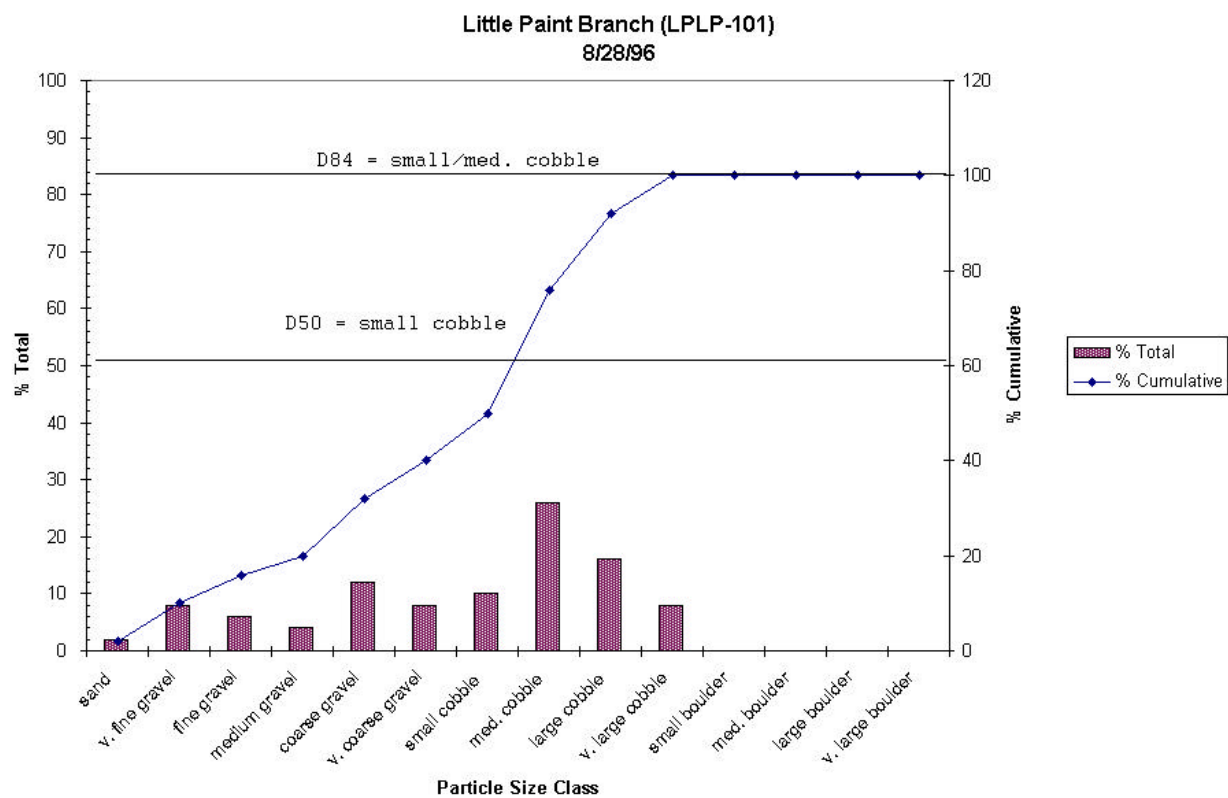


Figure 5. Pebble Count of riffle substrate within LPLP101, Galway Tributary. could be a result of pollutant discharges into the stream.

Tanglewood Tributary, Greencastle South Tributary, and Greencastle North Tributary

The Tanglewood, Greencastle South, and Greencastle North Tributaries received resource condition ratings of fair. All monitoring stations located along these tributaries received good stream habitat assessment scores. Habitat assessments conducted along Greencastle South Tributary identified the lack of bank vegetative cover and bank instability as the primary limiting factors. In addition, channel widening and entrenchment have reduced the habitat potential of this tributary system.

The cross-sectional information from the Tanglewood Tributary depicts an entrenched stream reach in this stream area (Figure 6). The channel at the Greencastle South Tributary is also entrenched, however, the stream may be forming a new active floodplain within the current channel width although at a lower elevation (Figure 7). The channel in the Greencastle North Tributary is also entrenched (Figure 8).

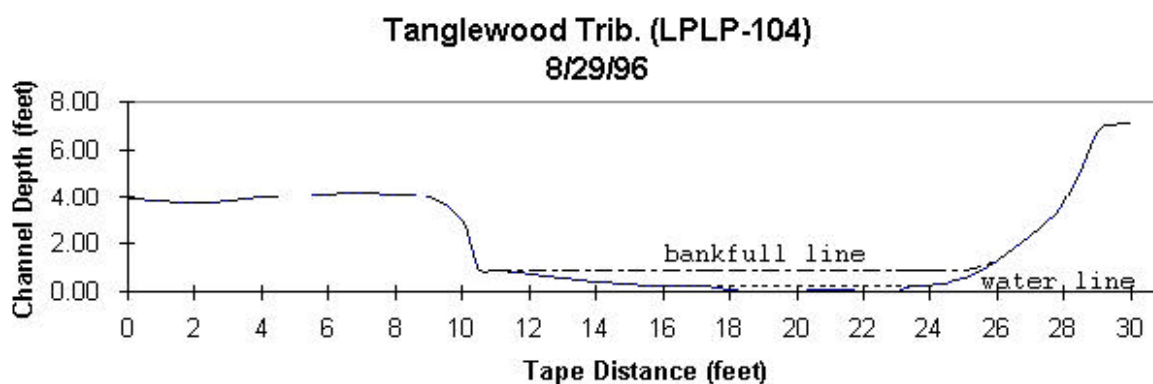


Figure 6. Cross-section of LPLP104, within the Tanglewood Tributary.

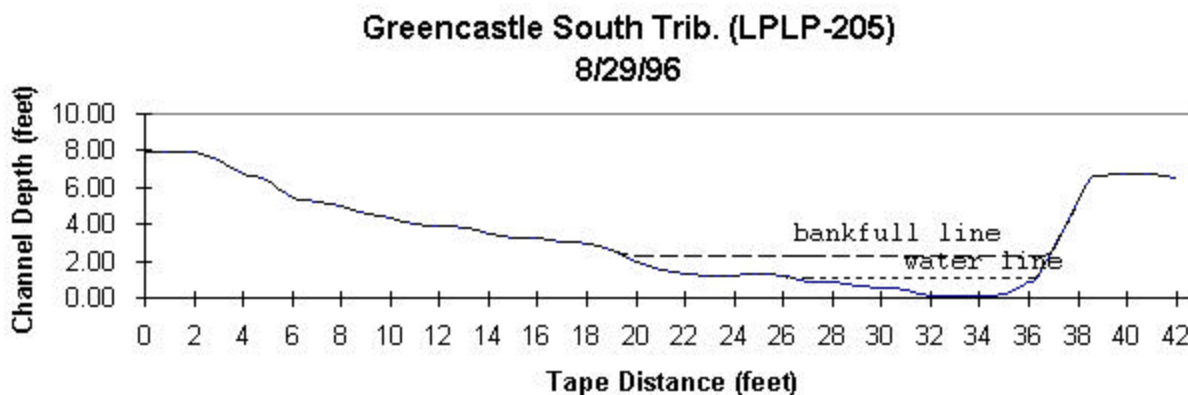


Figure 7. Cross-section of LPLP205, within the Greencastle South Tributary.

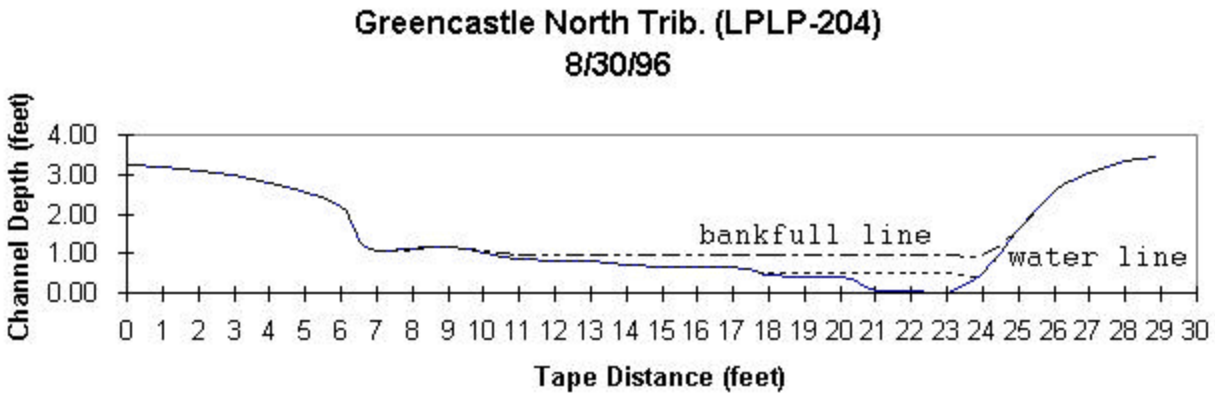


Figure 8. Cross-section of LPLP204, within the Greencastle North Tributary.

The dominant particle size in the Tanglewood Tributary monitoring station riffle was coarse gravel (16 to 32 mm) (Figure 9). The dominant particle size in the Greencastle South Tributary was also coarse gravel (16 to 32 mm) (Figure 10). The dominant particle size in the Greencastle North Tributary was slightly larger (coarse to very coarse gravel, about 32 mm) (Figure 11).

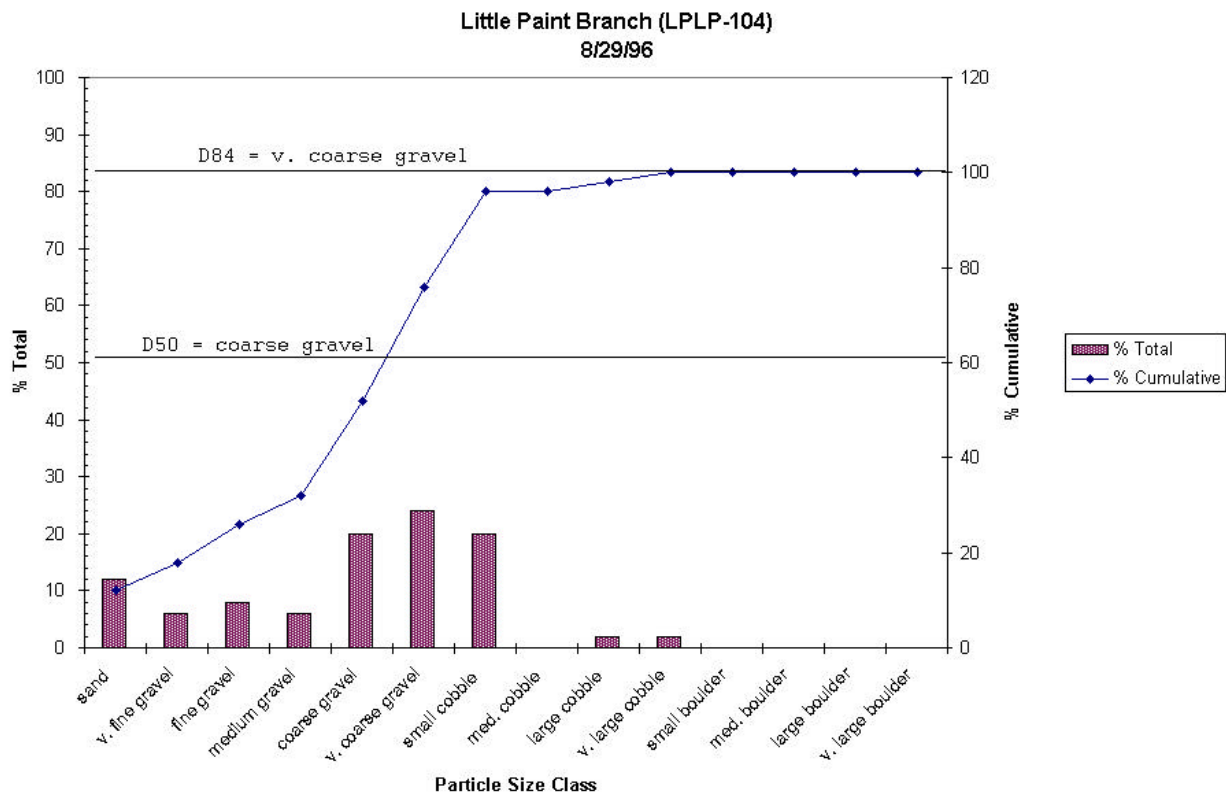


Figure 9. Composition of the riffle substrate (LPLP104) in the Tanglewood Tributary.

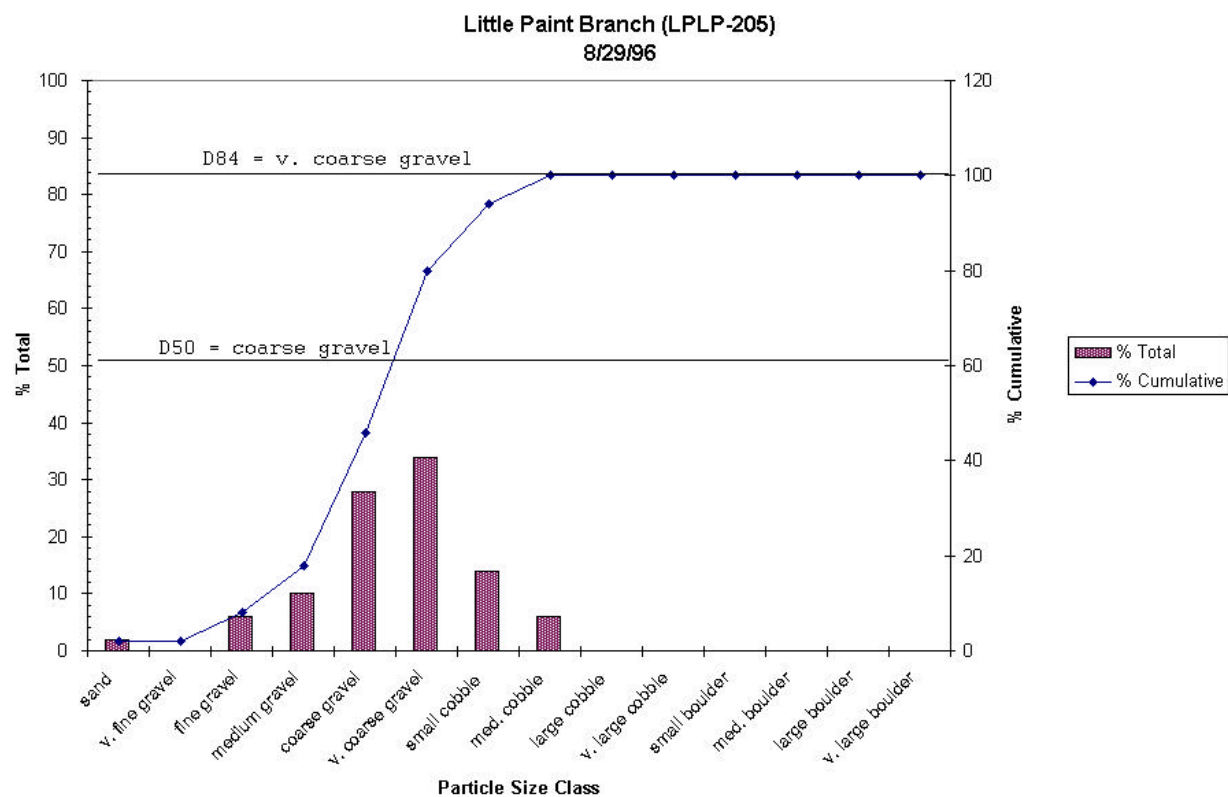


Figure 10. Composition of the riffle substrate (LPLP205) in the Greencastle South Tributary.

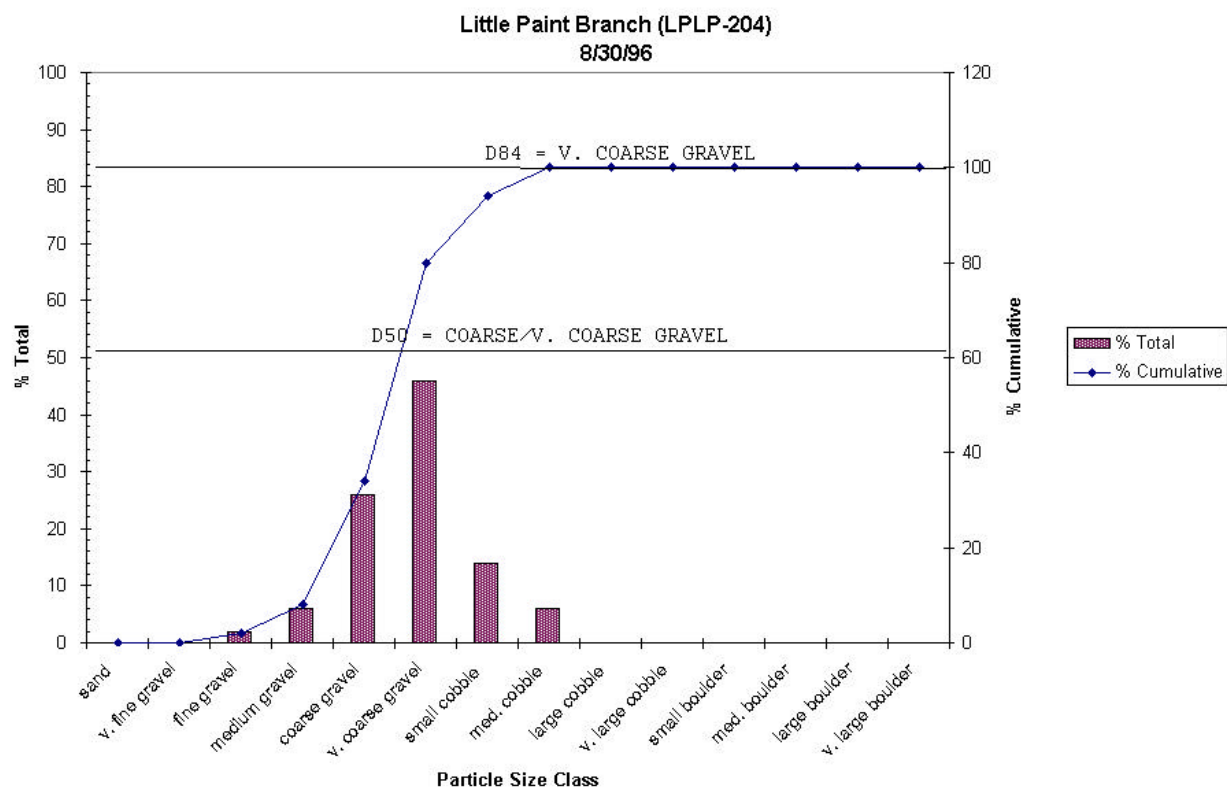


Figure 11. Composition of the riffle substrate (LPLP204) in the Greencastle North Tributary.

The small sized rocks in these riffles may be limiting the benthic macroinvertebrate community. The impairments seen in these three tributaries are most likely related to the physical effects of uncontrolled runoff.

Overall, the habitat assessments conducted along the Silverwood Tributary indicated better aquatic habitat than anywhere else in the watershed. This helps to support the resource condition rating of good. The only less than desirable habitat parameter appears to be increasing sediment deposition in the lowest portion of the Silverwood tributaries watershed. Cross-sectional analysis shows that the channel within the Silverwood Tributary still has access to its active floodplain (Figure 12). The main stem of Little Paint Branch within Fairland Recreational Park (LPLP301) shows moderate channel entrenchment (Figure 13). Dominant particle size in the riffles in this subwatershed was coarse (16 to 32 mm) and very coarse gravel (32 to 64 mm) respectively (Figure 14).

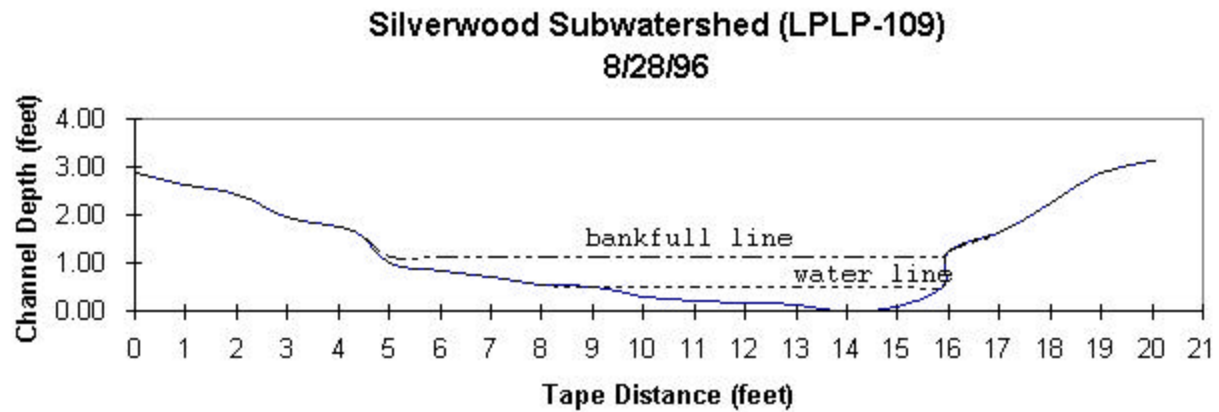


Figure 12. Cross-section within LPLP109, Silverwood Tributary.

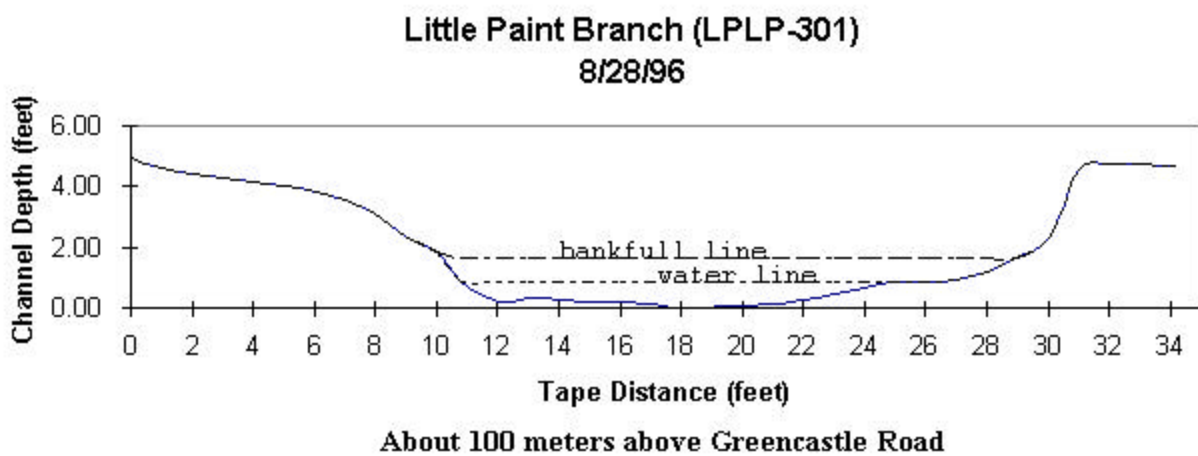


Figure 13. Cross-section within LPLP301, Little Paint Branch main stem above Greencastle Road.

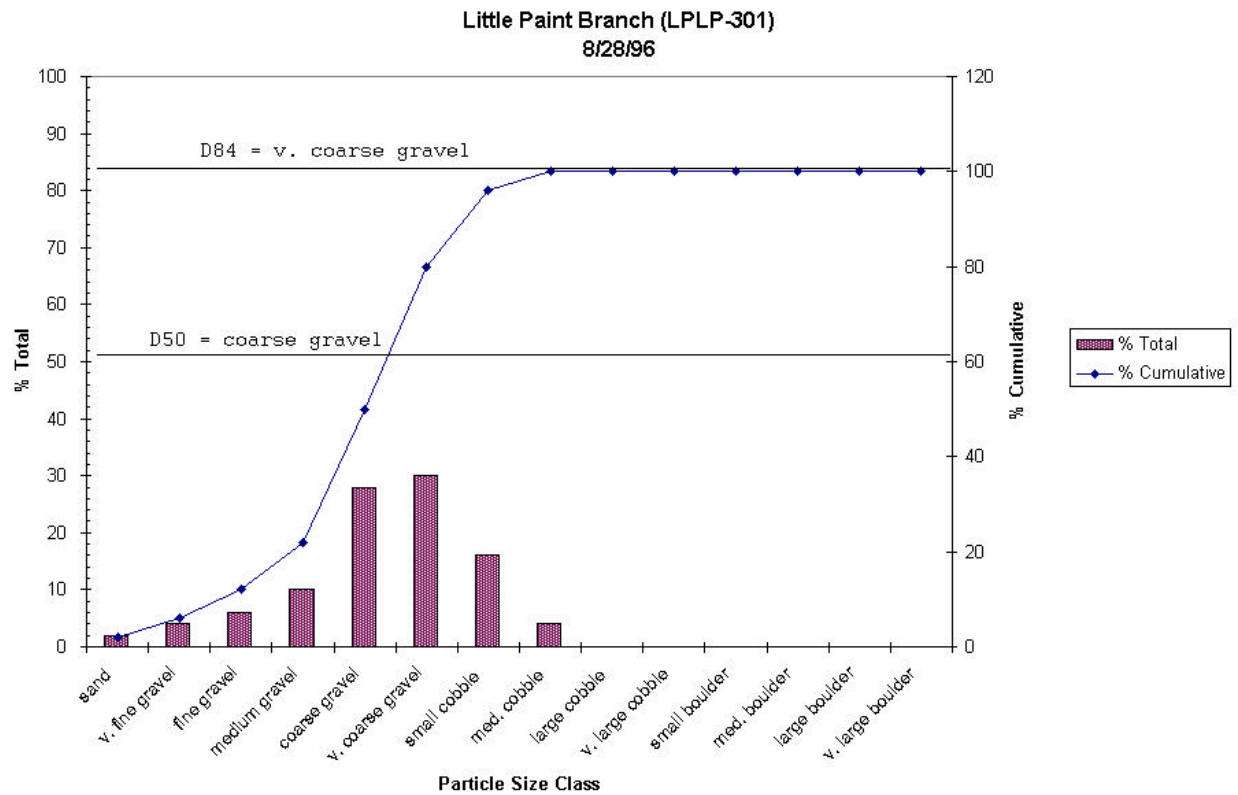


Figure 14. Composition of the riffle substrate (LPLP301) in the main stem of Little Paint Branch above Greencastle Road.

Water Temperature Recording

Three continually recording water temperature meters were placed within the Little Paint Branch watershed during August and September of 1996 (Figure 5). The August stream temperatures did not exceed 75° F. at any time at any of the stations. Overall, stream temperature does not appear to be a significant limiting factor in the Little Paint Branch watershed (Figures 15- 17).

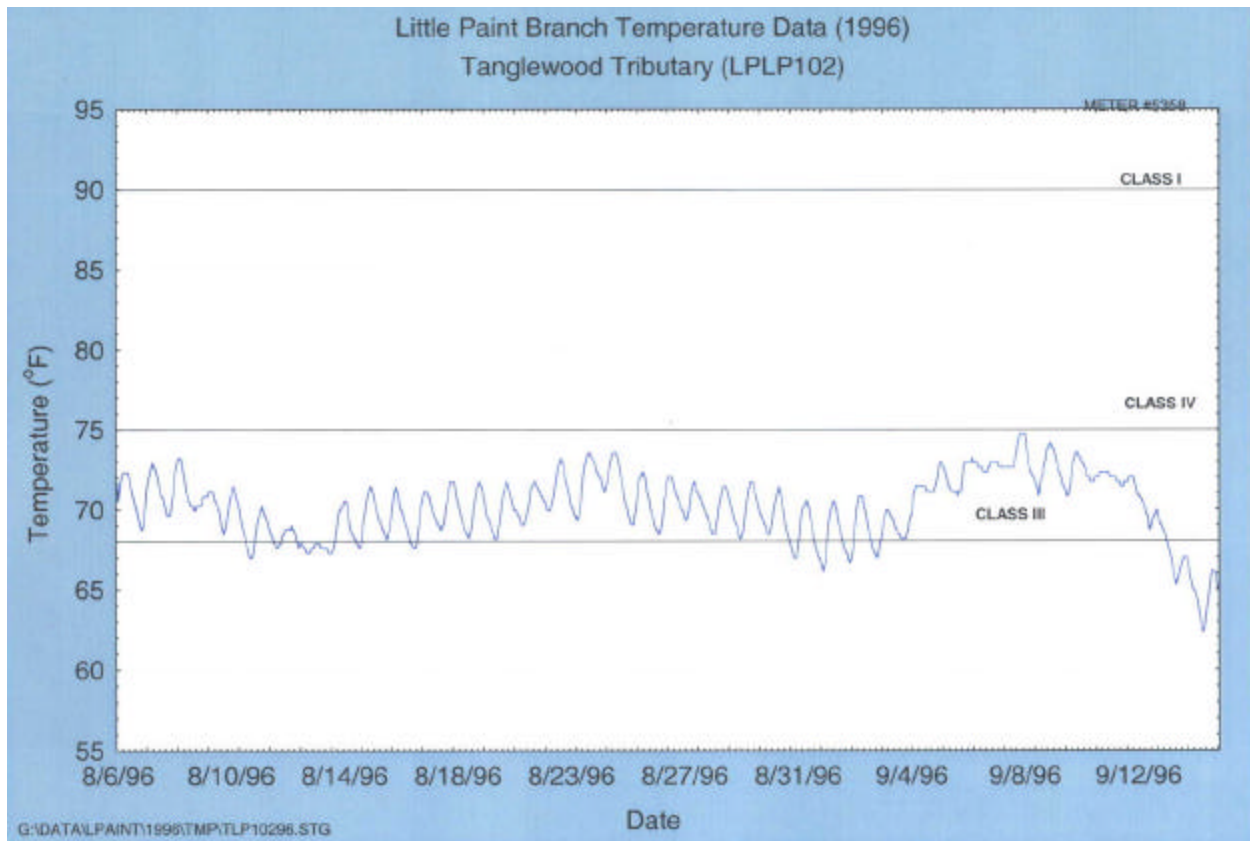


Figure 15. Water temperatures in the Tanglewood Tributary, August 6, 1996 to September 12, 1996.

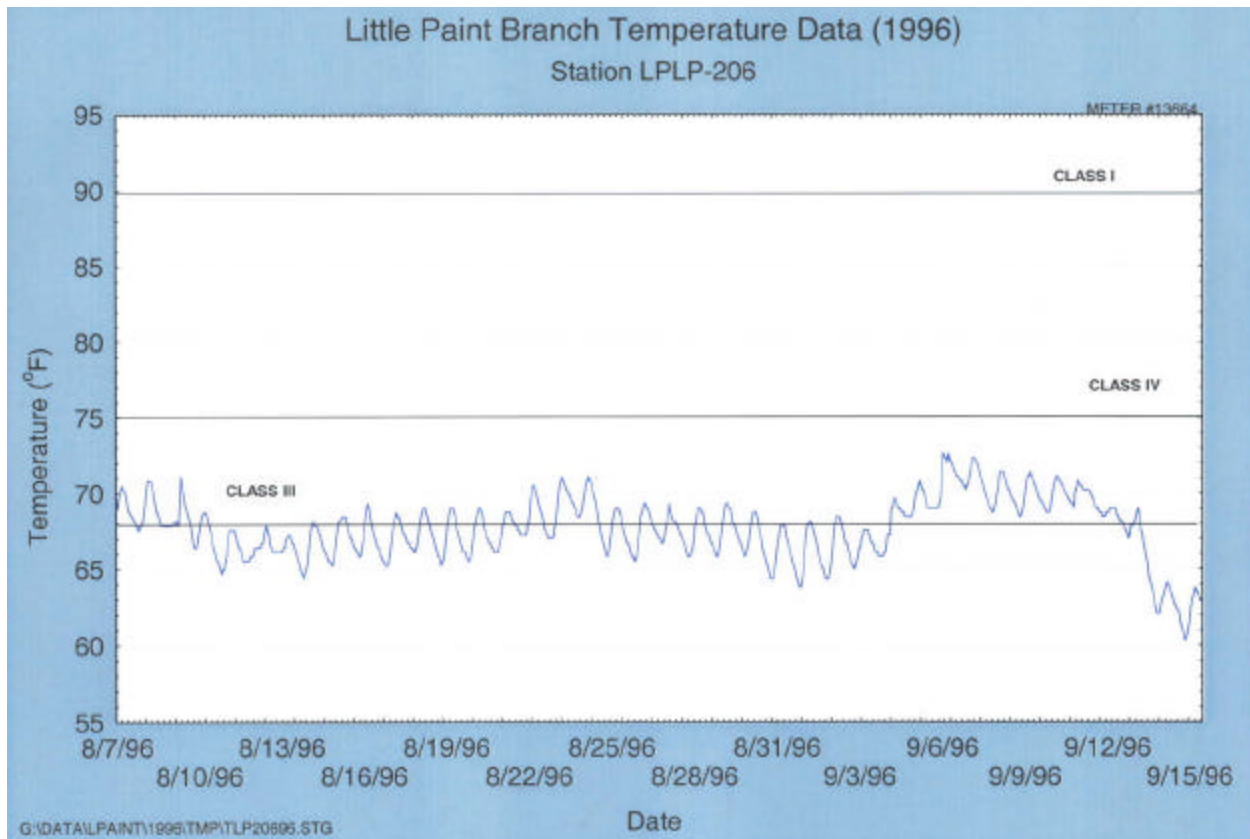


Figure 16. Water temperatures in Little Paint Branch main stem above the Silverwood Tributary, August 7, 1996 to September 12, 1996.

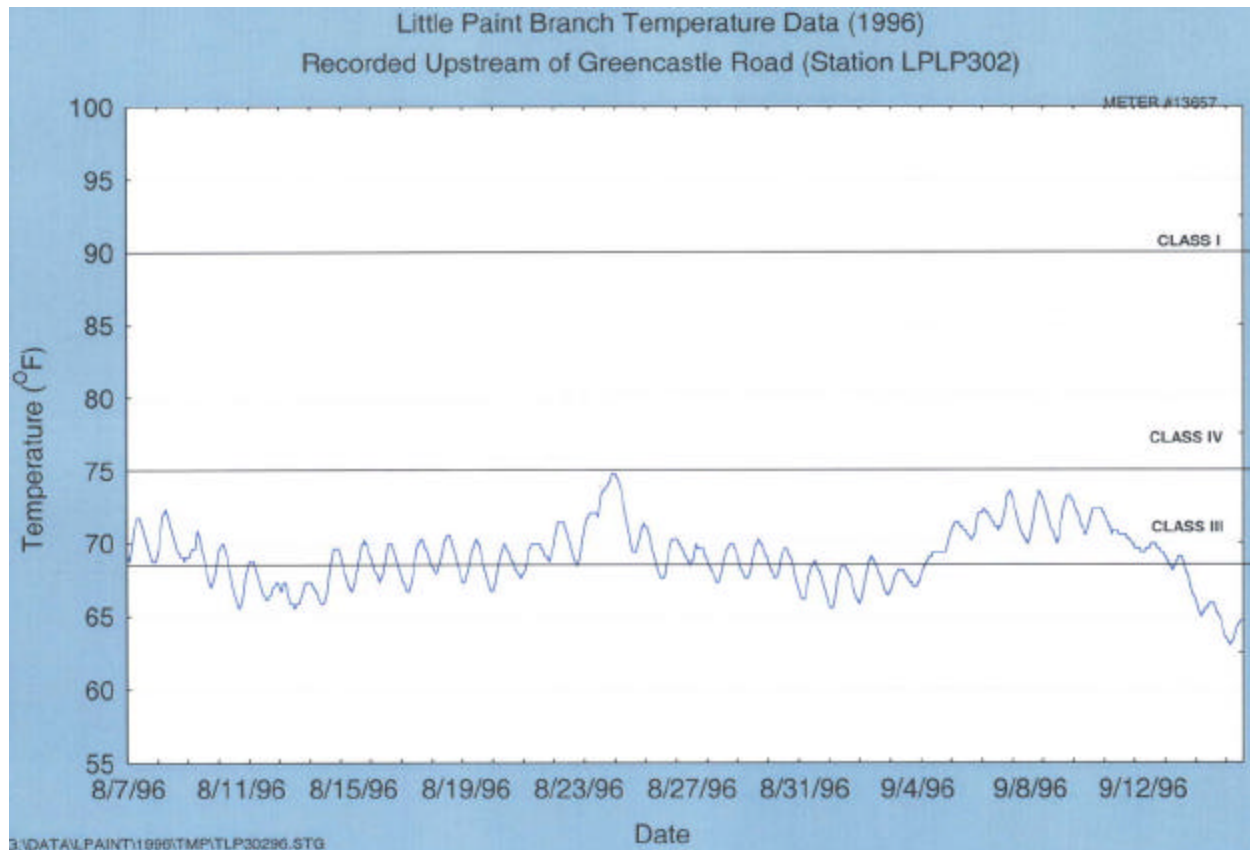


Figure 17. Water temperatures in Little Paint Branch main stem above Greencastle Road, August 7, 1996 to September 12, 1996.

Discussion

The resource condition becomes worse as one moves from north to south in the Little Paint Branch watershed. This relates to the age and pattern of development, with the oldest development occurring in the southern portion of the watershed. These earlier developments, for the most part, lacked stormwater management controls and stream protection measures. The later developments, farther north in the watershed, were generally built after the implementation of stormwater management and stream protection regulations.

The most significant stress placed on the aquatic resources of Little Paint Branch is that of uncontrolled stormwater runoff. The degree to which this has impacted the stream system varies, but it is apparent that no part of the watershed is completely free of its influence. No point sources of pollutants were found during the course of the field study, but as there is commercial and industrial development in the watershed, point sources may exist. It appears that the lowered resource conditions found can be attributed to habitat degradation and lowered water quality of uncontrolled storm runoff.

The upper portion of this watershed is still in good condition. With the intensity of development

in this portion of the Little Paint Branch watershed, restoration efforts should concentrate on identifying and stabilizing specific impaired stream habitat areas to maintain the existing high resource condition. Sites for SWM retrofits are extremely limited in this subwatershed. Existing ponds may be possible candidates for SWM retrofit sites. One proposed SWM project, the Silverwood Regional Pond, was dropped from the County's SWM program because of possible construction related impacts to high quality forested wetlands within the pond site. Other possible SWM retrofit sites should be investigated to obtain better control of the frequent storm event.

Restoration of the tributaries identified as having *poor* or *fair* resource conditions would first require that the uncontrolled runoff be managed. This would require retrofitting areas without stormwater management controls. The most likely place to begin to investigate areas for SWM retrofit opportunities would be in the Galway Tributary. Very little of this tributary's watershed is currently controlled. Capturing and reducing the peak volumes from frequent storm events through SWM retrofits may allow the existing natural stream channel to re-establish an active floodplain within its existing channel width, or, at least, lessen the degree of channel degradation present in this subwatershed.

S:\WMD\WRP\DATA\LPAIN\LPAIN.REP